

ABSTRACT

A metal insulator semiconductor field effect transistor (MISFET) is disclosed comprising a source layer being made with a material having a source band-gap (EG2) and a source mid-gap value (EGM2), the source layer having a source Fermi-Level (EF2). A drain layer has a drain Fermi-Level (EF4). A channel layer is provided between the source layer and the drain layer, the channel layer being made with a material having a channel band-gap (EG3) and a channel mid-gap value (EGM3), the channel layer having a channel Fermi-Level (EF3). A source contact layer is connected to the source layer opposite the channel layer, the source contact layer having a source contact Fermi-Level (EF1). A gate electrode has a gate electrode Fermi-Level (EF6). The source band-gap is substantially narrower (EG2) than the channel band-gap (EG3). The source contact Fermi-Level (EF1), the source Fermi-Level (EF2), the channel Fermi-Level (EF3), the drain Fermi-Level (EF4) and the gate electrode Fermi-Level (EF6) are equal to the source mid-gap value (EGM2) and the channel mid-gap value (EGM3), within a predetermined tolerance value, when no voltage is applied to the device.